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**KNOWLEDGE MANAGEMENT
STRATEGIES, HRM PRACTICES
AND INTELLECTUAL CAPITAL
IN KNOWLEDGE-INTENSIVE FIRMS**

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Abstract: In this paper, we examine the moderating role of knowledge management strategies of codification and personalization in “HRM – intellectual capital – firm performance” relationship. A survey data from 209 knowledge-intensive companies from Russia demonstrated that knowledge management strategy significantly alters the relationship between company’s HRM practices, intellectual capital and performance. In particular, we found that the more company is oriented towards codification knowledge management strategy, the stronger the positive HRM-performance relationship and the stronger the mediating effect of intellectual capital. However, analyzing decomposed variables of HRM (ability-enhancing, motivation-enhancing and opportunity enhancing) and specific intellectual capital resources (human, social and structural capitals), we found little support to the moderating role of knowledge management strategies in proposed relationships. The paper provides a valuable contribution strategic HRM literature and knowledge-based theory of the firm.

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Introduction

Seeing organizations as bundles of knowledge resources has become increasingly popular perspective among management scholars. The proponents of knowledge-based theory of the firm argue that knowledge resources are the major determinants of superior firm performance and organizations adopt knowledge management instruments to effectively allocate, bundle and use these resources. From this perspective, approaches to knowledge management can be divided into two categories: codification knowledge management strategy and personalization knowledge management strategy (Hansen et al., 1999). Codification knowledge management strategy is viewed as a people-to-document approach, and emphasizes the technology-based capability to codify, store, retrieve, and reuse explicit firm knowledge (Hansen et al., 1999; Powel, Ambrosini, 2012). Personalization knowledge management strategy is in contrast based on people-to-people approach; it emphasizes tacit knowledge transfer through person-to-person contacts and involves using teamwork to discuss problem solving (Hansen et al., 1999; Lin, 2011).

Based on its competitive strategy and availability of different knowledge resources, a company chooses to pursue one knowledge management strategy as a predominant and use the second to support the first. Importantly, scholars argue that by focusing on either of knowledge management strategies a firm determines its key practices for managing people and the way this practices contribute to the development of organizational intellectual capital resources (e.g. Lin, 2011). For instance, personalization-oriented firms usually adopt more sophisticated opportunity-enhancing HRM practices targeted on development of social (relational) capital, while firms with predominant codification strategy focus on ability-enhancing HRM practices, such as recruitment of graduates, group trainings and e-learning, that aim to enhance human capital. Despite the close relations between knowledge management strategies, HRM practices and intellectual capital resources are generally recognized in the literature (e.g. Powell, Ambrosini, 2012), no prior empirical studies that we know of have directly explored how knowledge management strategies determine company's HRM practices and their relation to intellectual capital resources. This study aims to bridge this gap by testing the moderating role of knowledge management strategy in "HRM – intellectual capital – firm performance" relationship.

Theoretical background

Knowledge management strategies

Company's capabilities in knowledge management strategies is widely considered as fundamental strategic factors in the contemporary knowledge economy (Grant, 1991; Drucker, 1993). Companies not only have to adopt various knowledge management practices, they should build complex knowledge management systems aligned with their competitive strategies and key strategic resources and capabilities. In fact, a chaotic implementation of all possible knowledge management best practices may, besides incurring major expenses, cause a conflict within organization's managerial system and lead to ineffective management of knowledge assets (Nonaka, Takuechi, 1995; Hansen et al., 1999). A deliberate approach imply focusing on a particular knowledge management strategy that best fit company's goals and internal architecture.

A KM strategy in KIOs serves as a roadmap to guide the organization's knowledge processes, i.e. acquisition, transfer and application (Donate and Canales, 2012; Bosua and Venkitachalam, 2013). This roadmap prescribes the dominant type of input knowledge that eventually turns to organizational output. KM strategy determines how this knowledge will be acquired, how it will be exchanged among employees and how it will be utilized in a production process.

Scholars have categorized knowledge management strategies by their external or internal focus, radical or incremental learning orientation, learning speed, breadth of knowledge base, level of consciousness (Bierly and Chakrabarti, 1996; Donate and Canales, 2012). The most accepted in literature typology of KM strategies is based on tacit or internal explicit knowledge prioritization, which divides KM strategies into personalization and codification (Hansen et al., 1999). Personalization KM strategy draws on person-to-person interaction to mobilize and share knowledge in tacit form across the organization (Hansen et al., 1999). Organizations employing this strategy aim to create and facilitate networks between people in order to share and learn from their individual skills, experiences and expertise, that often cannot be externalized and codified (Scheepers et al., 2004). Codification strategy, in contrast, seeks to externalize and formally represent the knowledge in company's knowledge base. The knowledge is codified not only to increase the opportunity to store it, but also to transfer it more easily, independently from the persons in which the knowledge is embodied (Bettiol et al., 2011).

The advantages of personalization strategy include a capability to transfer complex and rich information and the protection from leaks of knowledge to competitors (Kumar and Ganesh, 2011). Along with this, the disadvantages of personalization are the limitation by the number of people that can be reached, difficulties with incentivizing people for sharing their knowledge, and the risk of losing valuable knowledge with the loss of employees. Codification overcomes these limitations and benefits from the reduction of costs associated with the reinvention of knowledge assets and potentially unlimited reach of knowledge sharing system. Under codification strategy, knowledge is a property of the firm, so the loss of employees does not usually result in a loss of knowledge. The drawbacks of codification are the possibility of the involuntary transfer of knowledge to competitors (Kumar, Ganesh, 2011), the threat of information overload, inability to capture and use complex and tacit knowledge, and high expenditures on IT infrastructure.

Personalization and codification are not two distinct types of strategies, they rather represent different ends of the continuum, while real-world organizations are usually located somewhere in-between. Hansen et al. (1999) argued that an organization should pursue one strategy as a predominant and another one as a supportive in an 80-20% split. Other authors challenged this suggestion, arguing that equal split of codification and personalization is a more favorable choice for an organization. For instance, Choi and Lee (2003) reported that organizations employing dynamic (equal split of codification and personalization) KM strategy result in better performance. Sheepers et al. (2004) connected the choice of KM strategies to the maturity of knowledge processes. In the initial stages of strategy implementation an organization should have dominant emphasis on either strategy in order to avoid unwanted risks. Over time when knowledge processes become mature, effective use of organizational knowledge implies equal emphasis on both codification and personalization. Thus, the choice of the dominant emphasis on either codification or personalization remains relevant for organizations that start to manage their knowledge assets.

Knowledge management strategies and HRM

Knowledge management strategies are considered to determine company's HRM activities. For instance, Hansen et al. in their seminal piece (1999) write that codification-oriented companies tend to use more mass and unified HRM practices, such as graduate recruitment, group training, e-learning and pay-for-performance schemes, while personalization-oriented companies in contrast use practices that are more individual: recruitment of elite professionals, individual mentoring, process- or seniority-based pay. In fact, knowledge management strategies require different approaches to HRM to support them. Shih and Chuang (2005) have connected codification and personalization strategies to buy-bureaucratic and make-organic HRM strategies respectively. They showed that when knowledge management strategy is complemented by appropriate HRM strategy it results in a greater

effectiveness of company's knowledge management. Similar results were indicated by Haesli and Boxal (2005) who established the better fit between codification KM strategy and recruitment-based HRM strategy and personalization KM strategy and retention-based HRM strategy.

Two KM strategies are also associated with different approaches to team leadership. In particular, Merat and Bo (2014) have demonstrated that personalization strategy fit better to distributional leadership based on sharing of a leadership role among team members, while codification is to greater extent connected to centralized leadership, implying expressed single leadership role.

Based on this, we anticipate that knowledge management strategies moderates the relationship between HRM practices and performance. In particular, the positive relationship between ability-enhancing HRM practices and performance is strengthened for companies employing codification knowledge management strategy and the positive relationship between opportunity-enhancing HRM practices and performance is strengthened for companies employing personalization knowledge management strategy.

Knowledge management strategies, HRM and intellectual capital resources

Two knowledge management strategies stake on different intellectual capital resources. Codification strategy favors profession-specific human capital and structural capital in a form of organizational routines and databases, while personalization rely on firm-specific human capital and social capital (Hansen et al., 1999; De Toni et al., 2011).

Besides, prior research has tightly connected company's HRM activities and its intellectual capital resources. For instance, Fu et al. (2017) demonstrated that the use of high-performance HRM practices leads to development of human, social and structural firm capital. Particularly, they anticipated that if the organization aims to build high-quality human capital, development of skill-enhancing practices may be most critical, if social capital – motivation and opportunity-enhancing practices are likely to be key, if structural capital - opportunity-enhancing practices should be targeted. Although the mediating role of intellectual capital in HRM-performance relationship was widely supported by prior studies, scholars call for research of possible moderating mechanisms that provides us deeper understanding of the complex role of HRM in an organization.

Thus, we hypothesize that intellectual capital resources mediate the positive moderating effect of knowledge management strategies on HRM practices. In particular, we anticipate stronger positive mediating role of human and structural capital for companies employing codification knowledge management strategy and stronger positive mediating role of human and social capital and performance for companies employing personalization knowledge management strategy.

Data collected and research methodology

The research is based on two major categories of knowledge-intensive industries in Russia: professional services (consulting, IT, legal, architecture, etc.) and knowledge-intensive production (R&D, chemical, electronics). As a respondents we targeted HR partners, heads of HRM departments, CEOs and other top managers responsible for company's knowledge management and HRM processes. 209 companies participated in the survey either by filling online questionnaire or by telephone interviews, demonstrating a 10% response rate.

The measures of the questionnaire were based on already validated by previous research scales, including HRM practices scale (based on Gardner et al., 2011), intellectual capital scale (consisted of human, social and structural capitals; based on Youndt et al., 2004, and Fu et al., 2017), comparative firm performance scale (Delaney, Huselid, 1996) and knowledge management strategies scales (based on Kumar, Ganesh, 2011 and Lin, 2011). Exploratory factor analysis indicated good internal consistency of scales (Cronbach's alphas for all measures are above 0.7)

Results

Table 1 reports the means, standard deviations, and correlations of all variables. In general, our results showed significant correlations between dependent and independent variables and limited collinearity between our independent variables.

For the testing of our hypotheses, we used OLS regression modeling performed in Stata 13.0 software. We built two series of models: the first was based on composite measures of HRM practices and intellectual capital (Table 2) and the second included decomposed measures of HRM practices (separate variables for ability-, motivation- and opportunity-enhancing) and intellectual capital (human, social and structural capital) (Table 3).

The results confirm that knowledge management strategy significantly moderates and intellectual capital significantly mediates the relationship between HRM practices and performance. First, we found that our composite measure of HRM practices was significantly related to both perceived firm performance and intellectual capital after controlling for company size and age. Overall, the models with composite variables supported that intellectual capital has significant and positive mediating effect in HRM-performance relationship. Second, knowledge management strategy variable (ordinal variable, where 1 – personalization and 5 – codification) positively moderated the relationship between HRM and comparative firm performance, indicating that HRM practices are significantly stronger related to performance under codification rather than personalization.

However, the models with decomposed variables demonstrated little support to hypothesized relationships. First, we found that only ability-enhancing HRM practices measure was positively related to performance and intellectual capital. Second, only one out of three types of intellectual capital demonstrated sustainably significant positive mediating effect in HRM-performance relationship. Third, none of our decomposed models revealed a moderating effect of knowledge management strategies in HRM-intellectual capital-performance relationship.

In sum, we found support only for general hypotheses based on aggregated variables of both HRM and intellectual capital: we supported the mediating role of intellectual capital and the moderating role of knowledge management strategies in HRM-performance relationship. We rejected all hypotheses related to decomposed variables of HRM practices and intellectual capital. Since the procedure did not allow capturing separate effects of decomposed variables, this may be the result of their oppositely directed effects.

Table 1. Means, Standard Deviations and Correlations

Variables	Mean	s.d	1	2	3	4	5	6	7	8	9	10	11
1. Company age (log)	16.37	16.24											
2. Number of employees (log)	74.22	120.99	0.50*										
3. Performance	3.81	.52	0.09	0.26*									
4. Ability-enhancing HRM	2.50	.98	0.20*	0.38*	0.40*								
5. Motivation-enhancing HRM	2.76	.97	0.23*	0.39*	0.40*	0.69*							
6. Opportunity-enhancing HRM	4.24	.78	0.01	0.02	0.45*	0.22*	0.23*						
7. HRM (composite)	3.16	.71	0.20*	0.36*	0.53*	0.86*	0.86*	0.57*					
8. Human capital	4.25	.53	0.02	-0.04	0.42*	0.37*	0.27*	0.44*	0.46*				
9. Social capital	4.27	.59	0.26*	0.21*	0.35*	0.27*	0.20*	0.36*	0.35*	0.46*			
10. Structural capital	3.85	.63	0.25*	0.26*	0.40*	0.41*	0.38*	0.37*	0.50*	0.47*	0.44*		
11. Intellectual capital (composite)	4.12	.47	0.23*	0.19*	0.49*	0.44*	0.36*	0.48*	0.55*	0.79*	0.79*	0.82*	
12. Knowledge management strategy	2.23	.57	0.16*	0.23*	0.42*	0.36*	0.33*	0.28*	0.42*	0.26*	0.23*	0.50*	0.42*

n = 209

* p < 0.5

Table 2. Results of Regression Analyses Based on Composite Variables

Variables	Model 1 Performance	Model 2 Intellectual capital	Model 3 Performance	Model 4 Performance
Company age	.0001382	.0048399	-.0013865	-.0018737
Number of employees	.0003294	-.0005463	.0005015	.000447
HRM (composite)	.3710197***	.3713232***	.2540457***	.2266029***
Intellectual capital (composite)			.3150193***	
Knowledge management strategy				-.3084783*
HRM × Knowledge management strategy				.1162825***
Adj R-squared	.2784	0.3183	.3304	
F	25.95***	31.20***	24.93***	

* $p < 0.1$

** $p < 0.5$

*** $p < 0.01$

Table 3. Results of Regression Analyses Based on Decomposed Variables

Variables	Model 1 Human capital	Model 2 Structural capital	Model 3 Performance	Model 4 Performance	Model 5 Human capital	Model 6 Social capital	Model 7 Performance
Company age	-.0002737	.0067956	-.0007091	.0002913	.0007467	.005253	-.0001595
Number of employees	-.0011056	-.0004639	.0006384	.0006274	-.0009248	.00028	.0007768
Ability-enhancing HRM	.457696***	.4024638	.266903*	.3874363	.4917887*	-.1551305	.308386
Motivation-enhancing HRM	-.1892477	-.1290122	-.0311361				
Opportunity-enhancing HRM				.132695	.3392918*	.0193118	.0705426
Human capital			.23778***				.1797523**
Social capital							.0602707
Structural capital			-.0070709				
Knowledge management strategy	.1854873	.315919	.203488	.15858	.5915733	-.1945561	.0639694
Ability-enhancing HRM × KM strategy	-.0842085	-.0830589	-.0623813	-.0595656	-.0775248	.0508599	-.0486957
Motivation-enhancing HRM × KM strategy	.0584439	.0491808	.0254168				
Opportunity-enhancing HRM × KM strategy				.0197383	-.0459545	.0502053	.0249728
Adj. R-squared	.2574	.3999	.3377	.3047	.3563	.1986	.3301
F	10.61***	19.47***	11.99***	13.15***	16.34***	7.87***	11.62***

* $p < 0.1$ ** $p < 0.5$ *** $p < 0.01$

Discussion and conclusion

The findings of our analysis indicate the relationship between HRM practices, intellectual capital and performance was significantly moderated by company's knowledge management strategy. Although we failed to provide more in-depth understanding of what specific domains of HRM systems and intellectual capital resources are altered by chosen knowledge management strategy, in general our research suggest that knowledge management strategy significantly determine company's internal management architecture. The focus on predominant knowledge management strategy not only allows companies to choose optimal HRM practices, but also may prescribe what intellectual capital resources are the most important for value creation.

The research contributes to strategic HRM debates by introducing knowledge management strategy as an important moderator in HRM-performance relationship. It is generally accepted that HRM practices do not universally and directly affect firm performance, they rather contribute to development of intellectual capital resources that are of different importance for different firms and, therefore, companies should build their own unique HRM systems that best fit their key strategic resources. Confirming the moderating role of knowledge management strategies represents an important step forward in specifying the causal chain between HRM and firm performance.

A limitation of this study rests with the cross-sectional research design, which does not allow for conclusions regarding casual linkages between concepts. Therefore, we could not prove that higher firm performance and better intellectual capital resources are caused by the usage of more advanced HRM practices. Due to the peculiarities of the data collection, our research also may be limited by single respondent bias. Although we tried to follow the recommendations to minimize single respondent variance issues, we cannot claim that the results are not influenced by subjective perceptions of survey respondents (Podsakoff et al., 2003).

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